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DAVIS, CYNTHIA L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/828,703	SAIDI ET AL.	
	Examiner	Art Unit	
	Cynthia L Davis	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *56 and 57* is/are allowed.

6)☒ Claim(s) *1-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 47 and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Goldberg.

Regarding claim 47, train packets comprising a payload portion and a header portion, the payload portion having a plurality of data packets sharing a common corresponding switch processing parameter (SPP) encapsulated therein, the header portion including boundary information for the data packets encapsulated in the payload portion is disclosed in Goldberg, figures 6a and 6b. An input for receiving train packets; and a packet restorer connected to said input, wherein said packet restorer is configured to extract from each received train packet the data packets encapsulated therein according to the boundary information included in the header of the train packet is disclosed in Goldberg, column 7, lines 23-25.

Regarding claim 48, subtrain packets having a subtrain payload and a subtrain header, each subtrain payload comprising a portion of a train packet payload, wherein each subtrain packet set has an aggregate subtrain payload comprising an entire train packet payload, wherein at least one train packet payload comprises a plurality of data packets sharing a common switch processing parameter (SPP), and wherein each subtrain header includes slicing information for the subtrain packet set and boundary

information for the data packets encapsulated within the train packet payload is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 49-51 (the superpackets may be divided into smaller superpackets). A plurality N of inputs for receiving subtrain packets in parallel; a packet merger for reassembling the train packet payload from the aggregate subtrain payload of each set of received subtrain packets according to the slicing information included within the subtrain header of each subtrain packet in the subtrain packet set; and a packet restorer connected to said packet merger, wherein said packet restorer is configured to extract from each reassembled train packet the data packets encapsulated therein according to the boundary information included in the subtrain headers is disclosed in Goldberg, column 7, lines 23-25 (the receiving process applied to normal superpackets would also apply to divided superpackets, i.e., subtrain packets).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 5-9, 19, 20, 23-26, 38, 39, 42, 44-46, 49, and 52-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brech in view of Goldberg.

Regarding claim 1, receiving a plurality of data packets is disclosed in Brech, column 4, line 43. Queuing a plurality of data packets into a plurality of data packet queues according to their corresponding SPPs such that data packets sharing a

common corresponding SPP are commonly-queued and creating train packets from commonly-queued data packets is disclosed in column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Routing each train packet through the switch fabric as specified by its encapsulated SPP is disclosed in column 5, lines 28-29 (the processor sends the train out into the network). Each train packet comprising a payload and a header, wherein the train packet creating step includes encapsulating a plurality of commonly-queued data packets within the payload of at least one train packet and encapsulating the SPP corresponding to each data packet encapsulated in the train packet payload within the train packet header is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket.

Regarding claim 3, the train packet creating step includes the step of creating train packets having varying lengths is disclosed in Brech, column 5, lines 54-55.

Regarding claim 5, the train packet creating step includes the step of creating a train packet from whatever is queued in a non-empty data packet queue upon passage of a pre-selected time period after which that data packet queue became non-empty is disclosed in Brech, column 5, lines 27-29.

Regarding claim 6, each train packet payload is comprised of a plurality of payload blocks, and wherein the train packet payload encapsulating step includes encapsulating within each payload block either a plurality of data packets, a single data

packet, a portion of a data packet, padding, or some combination thereof is missing from Brech. However, Goldberg discloses in figure 6b a superpacket that has a payload consisting of a plurality of data packets. It would have been obvious to one skilled in the art at the time of the invention to have the payload block consist of a plurality of data packets. The motivation would be to consolidate the packets.

Regarding claim 7, once the train packet has been routed through the switch fabric, extracting from the train packet each data packet contained therein is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, that the receiving station disassembles the superpackets. It would have been obvious to one skilled in the art at the time of the invention to extract the data packets from the train packet. The motivation would be to be able to use received the data packets.

Regarding claim 8, sorting the data packets into a plurality of distribution classes according to a predetermined set of distribution criteria; and wherein the queuing step is preformed only upon the data packets sorted into less than all but at least one of said distribution classes is disclosed in Brech, column 4, lines 66-67 (the method may be used to group packets for one of the sessions).

Regarding claim 9, sorting the data packets into a plurality of distribution classes according to a predetermined set of distribution criteria; and wherein the queuing step is performed upon the data packets sorted into each of said distribution classes is disclosed in Brech, column 4, lines 66-67 (the method may be used to group packets for each session).

Regarding claim 19, a plurality of packet formatters for queuing together data packets sharing a common corresponding SPP, and creating train packets from the commonly-queued data packets is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Providing the train packets to a switch fabric is disclosed in Brech, column 5, lines 28-29 (the processor sends the train out into the network). Each train packet comprises a payload and a header, wherein the payload of at least one train packet includes a plurality of commonly-queued data packets, and wherein the header of each train packet includes the common SPP corresponding to each data packet included in the payload of that train packet is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket. The switch fabric having a plurality of switch fabric inputs for receiving train packets provided by the packet formatters and a plurality of switch fabric outputs for outputting routed train packets, wherein the switch fabric is configured to route each received train packet to a switch fabric output according to the SPP included in the header of each train packet; and a plurality of packet deformatters for receiving routed train packets outputted from the switch fabric, extracting data packets from the payloads of the received routed train packets, and outputting the extracted data packets is disclosed in Brech, figure 1, elements 8 and 12, (disclosing that the system of Brech is implemented on multiple computers that send and receive train packets between each other).

Regarding claim 20, each packet formatter comprises a packet queuer comprised of a plurality of waiting buffers for queuing data packets and a controller configured to queue data packets in the waiting buffers according to their corresponding SPPs such that data packets sharing a common corresponding SPP are commonly-queued, and for each waiting buffer, create a train packet therefrom by encapsulating in a train packet payload at least some of the data packets queued therein and encapsulating the SPP shared by the data packets encapsulated in the train packet payload in a train packet header is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53 (the packets are queued into trains in the memory).

Regarding claim 23, each packet queuer is further configured to create a train packet from whatever is queued in a non empty waiting buffer upon passage of a pre-selected time period after which that waiting buffer became non-empty is disclosed in Brech, column 5, lines 27-29.

Regarding claim 24, at least one packet formatter further comprises a plurality of said packet queuers is disclosed in Brech, column 5, lines 51-53 (the packets are queued by session id). A multiplexor for multiplexing the train packets created by said packet queuers is missing from Brech. However, Goldberg discloses in column 2, lines 10-13 a multiplexer on the transmit side of a superpacket system. It would have been obvious to one skilled in the art at the time of the invention to multiplex the queues of Brech. The motivation would be to combine the various transmission queues at the switch output.

Regarding claim 25, each train packet payload comprises a plurality of payload blocks, each payload block comprising a data portion and a control header portion, wherein the data portion comprises either a plurality of data packets, a single data packet, a portion of a data packet, padding, or some combination thereof, wherein the control header comprises deformatting information, and wherein each packet deformatter is configured to extract data packets from the train packet payloads according to the deformatting information within the control headers of the payload blocks is missing from Brech. However, Goldberg discloses in figure 6b a superpacket that has a payload consisting of a plurality of data packets; and in column 7, lines 23-25, that the received superpackets are disassembled. It would have been obvious to one skilled in the art at the time of the invention to have the payload block consist of a plurality of data packets, and to include deformatting information in the superpackets of Goldberg. The motivation would be to be able to deformat the received consolidated packets.

Regarding claim 26, each packet formatter is configured to create train packets having variable lengths is disclosed in Brech, column 5, lines 54-55.

Regarding claim 38, a packet queuer connected to an input, said packet queuer comprising a plurality of waiting buffers for queuing data packets therein and a controller configured to queue each data packet in an appropriate waiting buffer according to its SPP such that data packets sharing a common SPP are commonly-queued, and create train packets from the commonly-queued data packets is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Each train packet

having a payload and a header, wherein the payload of at least one train packet is comprised of a plurality of commonly-queued data packets, and wherein the header of each train packet includes the SPP corresponding to each data packet within the payload of that train packet is missing from Brech. However, Goldberg discloses this in figures 6a and 6b. It would have been obvious to one skilled in the art at the time of the invention to use the superpacket structure of Goldberg in the system of Brech. The motivation would be to consolidate the packets and decrease space taken up by header information.

Regarding claim 39, the packet queuer is further configured to create train packets having variable lengths is disclosed in Brech, column 5, lines 54-55.

Regarding claim 42, the packet queuer is further configured to create a train packet from whatever is queued in a non-empty waiting buffer once a pre-selected threshold amount of time has passed since that waiting buffer became non-empty is disclosed in Brech, column 5, lines 27-29.

Regarding claim 44, a plurality of said inputs, a plurality of said packet queuers, wherein each packet queuer is receives data packets from a different input is disclosed in Brech, column 5, lines 51-53 (the packets are queued by session id). A multiplexor connected to the plurality of packet queuers for multiplexing the train packets created from the packet queuers is missing from Brech. However, Goldberg discloses in column 2, lines 10-13 a multiplexer on the transmit side of a superpacket system. It would have been obvious to one skilled in the art at the time of the invention to multiplex

the queues of Brech. The motivation would be to combine the various transmission queues at the switch output.

Regarding claim 45, a slicing unit for slicing each train packet created by the controller into a set of N subtrain packets, each subtrain packet comprising a subtrain payload and a subtrain header, wherein each subtrain payload comprises a portion of the train packet payload of the train packet from which the subtrain packet set was sliced, and wherein each subtrain header includes the SPP of the train packet header of the train packet from which the subtrain packet set was sliced is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets.

Regarding claim 46, the slicing unit is configured to encapsulate slicing information for the train packet within each subtrain header is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to encapsulate slicing information in the subtrain headers. The motivation would be to be able to identify the slices on the receiving end.

Regarding claim 49, a multi-path switching system for routing data packets, said multi-path switch comprising a plurality of paths through which data packets are routed,

wherein each path is associated with a distribution class and configured to route data packets corresponding to said distribution class, and wherein at least one of the paths is comprised of a switch according to claim 19 is disclosed in Brech, figure 1 (showing a switched network using the system of claim 19).

Regarding claim 52, a plurality of packet queuers for creating train packets from data packets sharing a common SPP is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Each train packet having a payload and a header, wherein the payload of at least one train packet comprises a plurality of data packets sharing a common SPP, and wherein header of each train packet includes the SPP corresponding to each data packet comprising the payload of that train packet is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket. A plurality of traffic distributors for receiving train packets from the packet queuers and distributing each received train packet to at least one of a plurality of paths according to a predetermined set of distribution criteria, each path comprising a switch fabric for routing train packets according to their SPPs; and a plurality of packet deformatters for receiving train packets routed by the switch fabrics and deformatting each routed train packet by extracting data packets from each train packet payload is disclosed in Brech, figure 1 (showing a network in which train packets are sent and received, which would contain traffic distributors, and receiving/deformatting units).

Regarding claim 53, a plurality of packet queuers for creating train packets from data packets sharing a common SPP is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Each train packet having a payload and a header, wherein the payload of at least one train packet comprises a plurality of data packets sharing a common SPP, and wherein header of each train packet includes the SPP corresponding to each data packet comprising the payload of that train packet is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket. A plurality of traffic distributors for receiving train packets from the packet queuers and distributing each received train packet to at least one of a plurality of paths according to a predetermined set of distribution criteria is disclosed in Brech, figure 1 (showing a network in which train packets are transmitted). Wt least one of said paths comprises a slicing unit for receiving train packets from the traffic distributors and slicing each received train packet into a set of N subtrain packets, and a switch fabric having a plurality N of switch planes, each switch plane for routing a different subtrain packet within a subtrain packet set is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets.

The switch fabric within said at least one path comprising said slicing unit is linked to a plurality of packet deformatters for receiving subtrain packets, and reassembling the train packets from which the subtrain packets were sliced, and extracting data packets from the reassembled train packets is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, that the receiving process being applied to normal superpackets would also apply to divided superpackets, i.e., subtrain packets. It would have been obvious to one skilled in the art to receive and extract data packets from the subtrain packets. The motivation would be to be able to use the received data packets.

Regarding claim 54, means for receiving a plurality of data packets; means for queuing said received data packets into a plurality of data packet queues according to their corresponding SPPs such that data packets sharing a common corresponding SPP are commonly-queued; means for creating train packets from commonly-queued data packets, wherein said creating means is in circuit with said queuing means; and means for routing each train packet as specified by its encapsulated SPP, wherein said routing means is in circuit with said creating means is disclosed in Brech, column 4, lines 53-55 (the SPP is the session), column 5, lines 51-53, and figure 1 (showing a network in which train packets are routed). Each train packet comprising a payload and a header, wherein the creating means is configured to encapsulate a plurality of commonly-queued data packets within the payload of at least one train packet and encapsulate the SPP corresponding to each data packet encapsulated in the train packet payload within the train packet header is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have

been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket.

3. Claims 2, 4, 22, 27, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brech in view of Goldberg in further view of Carlson.

Regarding claim 2, the train packet creating step includes the step of creating a train packet from at least some of the data packets in a data packet queue if the data packets queued therein have an aggregate length greater than or equal to a preselected maximum threshold value is missing from Brech. However, Carlson discloses this in column 7, lines 35-40. It would have been obvious to one skilled in the art at the time of the invention to have a maximum length for the train packets. The motivation would be to have the packets conform to network limitations on packet size.

Regarding claim 4, the train packet creating step includes creating train packets having a fixed length is missing from Brech. However, Carlson discloses in column 1, lines 34-35, that fixed length train packets are typical in the art. It would have been obvious to one skilled in the art at the time of the invention to create fixed length packets. The motivation would be to use a well-known packet creating technique.

Regarding claim 22, each packet queuer is further configured to create a train packet from at least some of the data packets queued in a waiting buffer once the data packets queued therein have an aggregate length greater than or equal to a pre-selected maximum threshold value is missing from Brech. However, Carlson discloses this in column 7, lines 35-40. It would have been obvious to one skilled in the art at the

time of the invention to have a maximum length for the train packets. The motivation would be to have the packets conform to network limitations on packet size.

Regarding claim 27, each packet formatter is configured to create train packets having a fixed length is missing from Brech. However, Carlson discloses in column 1, lines 34-35, that fixed length train packets are typical in the art. It would have been obvious to one skilled in the art at the time of the invention to create fixed length packets. The motivation would be to use a well-known packet creating technique.

Regarding claim 40, the packet queuer is further configured to create train packets having a fixed length is missing from Brech. However, Carlson discloses in column 1, lines 34-35, that fixed length train packets are typical in the art. It would have been obvious to one skilled in the art at the time of the invention to create fixed length packets. The motivation would be to use a well-known packet creating technique.

Regarding claim 41, the packet queuer is further configured to create a train packet from the data packets queued in a waiting buffer if the data packets queued that waiting buffer have an aggregate length equal to or exceeding a pre-selected maximum threshold value is missing from Brech. However, Carlson discloses this in column 7, lines 35-40. It would have been obvious to one skilled in the art at the time of the invention to have a maximum length for the train packets. The motivation would be to have the packets conform to network limitations on packet size

4. Claims 10, 12, 14-18, 21, 28-30, 32, 34-36, 43, 50, 51, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brech in view of Goldberg in further view of Lee.

Regarding claim 10, receiving a plurality of data packets is disclosed in Brech, column 4, line 43. Queuing a plurality of data packets into a plurality of data packet queues according to their corresponding SPPs such that data packets sharing a common corresponding SPP are commonly-queued and creating train packets from commonly-queued data packets is disclosed in column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Routing each train packet through the switch fabric as specified by its encapsulated SPP is disclosed in column 5, lines 28-29 (the processor sends the train out into the network). Each train packet comprising a payload and a header, wherein the train packet creating step includes encapsulating a plurality of commonly-queued data packets within the payload of at least one train packet and encapsulating the SPP corresponding to each data packet encapsulated in the train packet payload within the train packet header is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket. For each train packet, creating a set of N subtrain packets, each subtrain packet comprising a subtrain payload and a subtrain header, wherein the step of creating a subtrain packet set includes creating the subtrain payloads by slicing each train packet payload into N slices, wherein each slice comprises a subtrain payload, and encapsulating within each subtrain header the SPP encapsulated within the train packet header of the train packet from which the set of subtrain packets was sliced is missing from Brech. However,

Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets. Routing each subtrain packet within a set of subtrain packets through a different switch plane within the switch fabric as specified by its encapsulated SPP is missing from Brech. However, Lee discloses in the abstract slicing packets and routing the individual slices through different control planes in a switch. It would have been obvious to one skilled in the art at the time of the invention to use the routing method of Lee with the subpackets of Goldberg in the system of Brech. The motivation would be to process the packets in parallel, to speed up switching time (see the abstract of Lee).

Regarding claim 12, the train packet creating step includes the step of creating train packets having varying lengths is disclosed in Brech, column 5, lines 54-55.

Regarding claim 14, the train packet creating step includes the step of creating a train packet from whatever is queued in a non-empty data packet queue upon passage of a pre-selected time period after which that data packet queue became non-empty is disclosed in Brech, column 5, lines 27-29.

Regarding claim 15, each train packet payload is comprised of a plurality of payload blocks, and wherein the train packet payload encapsulating step includes encapsulating within each payload block either a plurality of data packets, a single data packet, a portion of a data packet, padding, or some combination thereof is missing from Brech. However, Goldberg discloses in figure 6b a superpacket that has a payload

consisting of a plurality of data packets. It would have been obvious to one skilled in the art at the time of the invention to have the payload block consist of a plurality of data packets. The motivation would be to consolidate the packets.

Regarding claim 16,once each subtrain packet within a set of subtrain packets has been routed through a switch plane, reassembling the train packet from which that set of subtrain packets was created; and extracting each data packet from the reassembled train packet is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, and 49-50, that the receiving station disassembles the received superpackets into data packets; it would also extract data packets from the smaller sub-superpackets. It would have been obvious to one skilled in the art at the time of the invention to extract the data packets from the received train and subtrain packets. The motivation would be to be able to use the received data packets.

Regarding claim 17, sorting the data packets into a plurality of distribution classes according to a predetermined set of distribution criteria; and wherein the queuing step is preformed only upon the data packets sorted into less than all but at least one of said distribution classes is disclosed in Brech, column 4, lines 66-67 (the method may be used to group packets for one of the sessions).

Regarding claim 18, sorting the data packets into a plurality of distribution classes according to a predetermined set of distribution criteria; and wherein the queuing step is performed upon the data packets sorted into each of said distribution classes is disclosed in Brech, column 4, lines 66-67 (the method may be used to group packets for each session).

Regarding claim 21, each packet queuer further comprises a plurality of backlog buffers for queuing train packets, each backlog buffer corresponding to a waiting buffer, and wherein the controller is further configured to queue each train packet in a backlog buffer corresponding to the waiting buffer from which that train packet was created is missing from Brech. However, Lee discloses in figure 2, element 123, and column 8, lines 36-37, a buffer in a routing system. It would have been obvious to one skilled in the art at the time of the invention to include buffers in the system of Brech. The motivation would be to have a place to store packets that are waiting to be transmitted.

Regarding claim 28, a plurality of packet formatters, each of said packet formatters configured to queue data packets according to their corresponding SPPs such that data packets sharing a common corresponding SPP are commonly-queued is disclosed in Brech, column 4, lines 53-55 (the SPP is the session) and column 5, lines 51-53. Creating subtrain packet sets from the commonly-queued data packets, each subtrain packet set comprising a plurality N of subtrain packets, each subtrain packet comprising a subtrain payload and a subtrain header, wherein the subtrain payloads of the subtrain packets in at least one subtrain packet set encapsulate a plurality of commonly-queued data packets in the aggregate, and wherein the subtrain header of each subtrain packet in each subtrain packet set includes the SPP shared by each data packet encapsulated in the aggregated subtrain payload of that subtrain packet set is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of

the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets. For each subtrain packet set, output the subtrain packets included in that subtrain packet set in parallel; a switch fabric for routing subtrain packet sets received from the packet formatters, said switch fabric comprising a plurality N of switch planes, each switch plane having a plurality of switch plane inputs for receiving subtrain packets from the packet formatters and a plurality of switch plane outputs for outputting subtrain packets, wherein each switch plane is configured to receive a subtrain packet from each subtrain packet set, and route each received subtrain packet to a switch plane output according to the SPP included in its subtrain header is missing from Brech. However, Lee discloses in the abstract slicing packets and routing the individual slices in parallel. It would have been obvious to one skilled in the art at the time of the invention to use the routing method of Lee with the subpackets of Goldberg in the system of Brech. The motivation would be to process the packets in parallel, to speed up switching time. A plurality of packet deformatters, each packet deformatter configured to receive routed subtrain packet sets from the switch fabric, and extract from the received subtrain packet sets the data packets encapsulated therein is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, that the receiving station disassembles the superpackets, and also that smaller superpackets (i.e., subtrain packets) may be sent and received in column 7, lines 49-50. It would have been obvious to one skilled in the art at the time of the invention to extract the data packets from the train packet. The motivation would be to be able to use the received data packets.

Regarding claim 29, each packet formatter comprises a packet queuer for creating train packets from commonly-queued data packets and a slicing unit for creating subtrain packet sets from the train packets created by the packet queuer is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets. Each packet queuer comprising a plurality of waiting buffers for queuing data packets and a controller configured to queue data packets in the waiting buffers according to their corresponding SPPs such that data packets sharing a common corresponding SPP are commonly-queued is missing from Brech. However, Lee discloses in figure 2, element 123, and column 8, lines 36-37, a buffer in a routing system. It would have been obvious to one skilled in the art at the time of the invention to include buffers in the system of Brech. The motivation would be to have a place to store packets that are waiting to be transmitted. For each waiting buffer, create a train packet therefrom by encapsulating in a train packet payload at least some of the data packets queued therein and encapsulating the SPP shared by the data packets encapsulated in the train packet payload in a train packet header is disclosed in Brech, column 5, lines 51-53. The slicing unit being configured to, for each train packet created by the packet queuer, create N subtrain payloads for the N subtrain packets in a subtrain packet set by slicing the payload of a train packet into N slices is missing from Brech. However, Lee discloses in the abstract a packet slicer that slices a

packet into N slices. It would have been obvious to one skilled in the art at the time of the invention to slice the packets. The motivation would be to work with smaller packets.

Regarding claim 30, each packet queuer further comprises a plurality of backlog buffers for queuing train packets awaiting slicing by the slicing unit is missing from Brech. However, Lee discloses in figure 2, element 123, and column 8, lines 36-37, a buffer in a routing system. It would have been obvious to one skilled in the art at the time of the invention to include buffers in the system of Brech. The motivation would be to have a place to store packets that are waiting to be transmitted.

Regarding claim 32, each packet queuer controller is configured to create a train packet from whatever is queued in a non empty waiting buffer upon passage of a pre-selected amount of time after which that waiting buffer became non-empty is disclosed in Brech, column 5, lines 27-29.

Regarding claim 34, each packet queuer controller is configured to create train packets having varying lengths is disclosed in Brech, column 5, lines 54-55.

Regarding claim 35, at least one packet formatter further comprises a plurality of said packet queuers is disclosed in Brech, column 5, lines 51-53 (the packets are queued by session id). A multiplexor for multiplexing the train packets created by the plurality of said packet queuers upstream from the slicing unit is missing from Brech. However, Goldberg discloses in column 2, lines 10-13 a multiplexer on the transmit side of a superpacket system. It would have been obvious to one skilled in the art at the

time of the invention to multiplex the queues of Brech. The motivation would be to combine the various transmission queues at the switch output.

Regarding claim 36, the slicing unit of each packet formatter is further configured to, for each subtrain packet set, encapsulate slicing information within the subtrain header of each subtrain packet within a subtrain packet set, wherein the switch planes in the switch fabric are configured to be synchronous with each other is missing from Brech. However, Lee discloses in the abstract a packet slicer that sends packet slices over parallel planes in a switch. It would have been obvious to one skilled in the art at the time of the invention to slice the packets, encapsulate the slicing info, and send them over synchronous planes. The motivation would be to work with smaller packets in parallel, to speed up processing time. Each packet deformatter comprises a packet merger configured to reassemble the train packet payloads from which each received subtrain packet set was sliced according to the slicing information encapsulated in the subtrain packet headers, and a packet restorer configured to extract each data packet from the reassembled train packet payloads is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, and 49-50, that the receiving station disassembles the received superpackets into data packets; it would also extract data packets from the smaller sub-superpackets. It would have been obvious to one skilled in the art at the time of the invention to extract the data packets from the received train and subtrain packets. The motivation would be to be able to use the received data packets.

Regarding claim 43, the packet queuer further comprises a plurality of backlog buffers for queuing train packets is missing from Brech. However, Lee discloses in

figure 2, element 123, and column 8, lines 36-37, a buffer in a routing system. It would have been obvious to one skilled in the art at the time of the invention to include backlog buffers in the system of Brech. The motivation would be to have a place to store packets that are waiting to be transmitted.

Regarding claim 50, at least one of the paths is comprised of a switch according to claim 28, wherein the path that is comprised of the switch according to claim 28 is a different path than the path that is comprised of the switch according to claim 19 is disclosed in Brech, figure 1 (showing a switched network that could use either or both of the systems of claims 19 or 28).

Regarding claim 51, a multi-path switching system for routing data packets, said multi-path switching system comprising a plurality of paths through which data packets are routed, wherein each path is associated with a distribution class and configured to route data packets corresponding to said distribution class, and wherein at least one of the paths is comprised of a switch according to claim 28 is disclosed in Brech, figure 1 (showing a switched network using the system of claim 28).

Regarding claim 55, means for receiving a plurality of data packets; means for queuing said received data packets into a plurality of data packet queues according to their corresponding SPPs such that data packets sharing a common corresponding SPP are queued within the same data packet queue; means for creating train packets from commonly-queued data packets is disclosed in Brech, column 4, lines 53-55 (the SPP is the session), and column 5, lines 51-53. Each train packet comprising a payload and a header, wherein the train packet creating means is configured to encapsulate a

plurality of commonly-queued data packets within the payload of at least one train packet and encapsulate the common SPP corresponding to each data packet encapsulated in the train packet payload within the train packet header, wherein said train packet creating means is in circuit with said queuing means is missing from Brech. However, this is disclosed in Goldberg, figures 6a and 6b, and column 7, lines 42-50. It would have been obvious to one skilled in the art at the time of the invention to use the packet structure of Goldberg in the invention of Brech. The motivation would be to decrease the amount of space devoted to the header information in the superpacket. Means for creating a set of N subtrain packets from each train packet created by the train packet creating means, each subtrain packet comprising a subtrain payload and a subtrain header, wherein said subtrain packet set creating means is configured to create subtrain payloads by slicing each train packet payload into N slices, wherein each slice comprises a subtrain payload, and encapsulate within each subtrain header the SPP encapsulated within the train packet header of the train packet from which the set of subtrain packets was sliced is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets. Means for routing each subtrain packet within a set of subtrain packets through a different switch plane within the routing means as specified by its encapsulated SPP is missing from Brech. However, Lee discloses in the abstract slicing packets and routing

the individual slices through different control planes in a switch. It would have been obvious to one skilled in the art at the time of the invention to use the routing method of Lee with the subpackets of Goldberg in the system of Brech. The motivation would be to process the packets in parallel, to speed up switching time (see the abstract of Lee).

5. Claims 11, 13, 31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brech in view of Goldberg in further view of Lee and Carlson.

Regarding claim 11, the train packet creating step includes the step of creating a train packet from at least some of the data packets in a data packet queue if the data packets queued therein have an aggregate length greater than or equal to a preselected maximum threshold value is missing from Brech. However, Carlson discloses this in column 7, lines 35-40. It would have been obvious to one skilled in the art at the time of the invention to have a maximum length for the train packets. The motivation would be to have the packets conform to network limitations on packet size.

Regarding claim 13, the train packet creating step includes creating train packets having a fixed length is missing from Brech. However, Carlson discloses in column 1, lines 34-35, that fixed length train packets are typical in the art. It would have been obvious to one skilled in the art at the time of the invention to create fixed length packets. The motivation would be to use a well-known packet creating technique.

Regarding claim 31, each packet queuer controller is configured to create a train packet from at least some of the data packets queued in a waiting buffer once the data packets queued in that waiting buffer have an aggregate length equal to or exceeding a pre-selected maximum threshold value is missing from Brech. However, Carlson

discloses this in column 7, lines 35-40. It would have been obvious to one skilled in the art at the time of the invention to have a maximum length for the train packets. The motivation would be to have the packets conform to network limitations on packet size.

Regarding claim 33, each packet queuer controller is configured to create train packets having a fixed length is missing from Brech. However, Carlson discloses in column 1, lines 34-35, that fixed length train packets are typical in the art. It would have been obvious to one skilled in the art at the time of the invention to create fixed length packets. The motivation would be to use a well-known packet creating technique.

6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brech in view of Goldberg in further view of Lee and Arnold.

Regarding claim 37, the slicing unit of each packet formatter is further configured to, for each subtrain packet set, encapsulate slicing information within the subtrain header of each subtrain packet within a subtrain packet set is missing from Brech. However, Goldberg discloses in column 7, lines 49-50, that oversized superpackets may be divided into smaller superpackets, which would contain the SPP information. It would have been obvious to one skilled in the art at the time of the invention to slice up the train packets into subtrain packets. The motivation would be to limit the total size of the train packets. The switch planes being asynchronous with each other is missing from Brech. However, Arnold discloses in column 6, lines 34-35, asynchronous switch planes. It would have been obvious to one skilled in the art at the time of the invention to have asynchronous switch planes in the system of Brech. The motivation would be to be able to process the packet slices independently on each plane. Each packet

deformatter comprises a packet merger configured to queue subtrain packets received from the switch planes, wherein the subtrain packets in the same subtrain packet set are commonly-queued, and for each queued subtrain packet set, reassemble the train packet payload from which that subtrain packet set was sliced according to the slicing information encapsulated in the subtrain packet headers, and a packet restorer configured to extract each data packet from the reassembled train packet payloads is missing from Brech. However, Goldberg discloses in column 7, lines 23-25, and 49-50, that the receiving station disassembles the received superpackets into data packets; it would also extract data packets from the smaller sub-superpackets. It would have been obvious to one skilled in the art at the time of the invention to extract the data packets from the received train and subtrain packets. The motivation would be to be able to use the received data packets.

Allowable Subject Matter

7. Claims 56 and 57 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia L Davis whose telephone number is (571) 272-3117. The examiner can normally be reached on 8:30 to 6, Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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